

NON-PUBLIC?: N  
ACCESSION #: 9506280202  
LICENSEE EVENT REPORT (LER)

FACILITY NAME: SURRY POWER STATION, Unit 2 PAGE: 1 OF 7

DOCKET NUMBER: 05000281

TITLE: Manual Trip Due to Control Rods Dropping into Reactor  
Core  
EVENT DATE: 05/21/95 LER #: 95-005-00 REPORT DATE: 06/20/95

OTHER FACILITIES INVOLVED: DOCKET NO: 05000

OPERATING MODE: N POWER LEVEL: 100%

THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR  
SECTION:  
50.73(a)(2)(iv)

LICENSEE CONTACT FOR THIS LER:  
NAME: D. A. Christian, Station Manager TELEPHONE: (804) 357-3184

COMPONENT FAILURE DESCRIPTION:  
CAUSE: X SYSTEM: AA COMPONENT: MANUFACTURER: W120  
X TI W120  
REPORTABLE NPRDS: Y  
N

SUPPLEMENTAL REPORT EXPECTED: NO

#### ABSTRACT:

Unit 2 was operating at 100% power on May 21, 1995 when Control Rod B-6, Control Bank A, Group 2 dropped into the reactor core at 1222 hours. At 1223 hours the remaining Control Bank A, Group 2 control rods dropped into the core. A manual reactor trip was initiated at 1223 hours as required by abnormal procedures. Appropriate operator actions were taken in accordance with emergency operating procedures to ensure the performance of system automatic actions and to respond to abnormal conditions. The unit was quickly brought to a stable, no-load condition. A Root Cause Evaluation (RCE) Team investigation was initiated to determine the cause of this event and to recommend corrective actions. The RCE Team concluded that this event was caused by a loose solder connection on a stationary gripper coil regulation circuit card. The loose solder connection was attributed to the age of the circuit card and

heat from the operating environment. The results of the RCE Team investigation will be presented to management and recommendations that are designed to prevent the recurrence of this event will be implemented. This report is being submitted pursuant to 10 CFR 50.73(a)(2)(iv).

END OF ABSTRACT

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## 1.0 DESCRIPTION OF THE EVENT

Unit 2 was operating at 100% power on May 21, 1995 when Control Rod B-6, Control Bank A, Group 2 dropped into the reactor core at 1222 hours. The upper/lower flux deviation, NIS dropped rod, and individual rod position indicator less than 20 steps annunciators EIIS-AA,ANN! alarmed in the control room. At 1223 hours, the remaining control rods in Control Bank A, Group 2 dropped into the core. In accordance with Abnormal Procedure, 0-AP-1.00, Rod Control System Malfunction, Control Room Operators manually tripped the reactor.

The reactor trip was followed by a turbine trip, main generator trip, and actuation of the Anticipated Transient Without SCRAM Mitigation System Actuation Circuitry (AMSAC), as designed. Control Room Operators initiated the appropriate emergency operating procedures.

As designed, the motor-driven and turbine-driven auxiliary feedwater pumps EIIS-BA,P! started on low-low steam generator water level and provided flow to the steam generators. The main steam dumps EIIS-SB,V! automatically opened to admit steam directly to the main condenser. The steam dumps closed and the Reactor Coolant System (RCS) average temperature initially stabilized at approximately 544 degrees F. RCS temperature then slowly decreased to 539 degrees F. The auxiliary feedwater pumps were secured in accordance with emergency procedures and the RCS temperature was stabilized at approximately 547 degrees F.

The plant response was as expected, except for the following notable discrepancies:

- o The Reactor Coolant Pump (RCP) 2-RC-P-1C seal leak-off low flow annunciator alarmed. Control Room Operators monitored RCP EIIS-AB,P! parameters in accordance with Abnormal Procedure 2-AP-9.00, RCP Abnormal Conditions. The alarms cleared without additional operator action.

## 1.0 DESCRIPTION OF THE EVENT (Continued)

o The air side to hydrogen side differential pressure for the Main Generator Seal Oil Package EHS-TI was noted to be greater than 24 inches of mercury. Therefore, operators secured the air side oil pump and air side oil backup pumps. When the operators noted Main Generator hydrogen pressure was decreasing, the air side oil pump was restarted and the air side oil backup pump was placed in automatic. Hydrogen pressure stabilized.

o The illumination of the Individual Rod Position Indication (IRPI) rod bottom light EHS-AA,ZI for Control Rod M-10 was delayed.

The NRC was notified pursuant to 10 CFR 50.72(b)(2)(ii) on May 21, 1995 at 1551 hours. This report is being submitted pursuant to 10 CFR 50.73(a)(2)(iv) as a manual actuation of the Reactor Protection System and automatic actuation of the Auxiliary Feedwater System.

## 2.0 SIGNIFICANT SAFETY CONSEQUENCES AND IMPLICATIONS

This event resulted in no safety consequences or implications. Appropriate operator actions were taken in accordance with emergency operating procedures to ensure the performance of system automatic actions and to respond to abnormal conditions. The unit was quickly brought to a stable, no-load condition. Therefore, the health and safety of the public were not affected at any time during this event.

## 3.0 CAUSE OF THE EVENT

A multi-discipline Root Cause Evaluation (RCE) Team was established on May 12, 1995 to investigate the cause of the May 11, 1995 Unit 2 reactor trip (LER 50-281/95-004-00). The scope of the RCE was expanded to also investigate and recommend corrective actions for the May 21, 1995 event. The RCE Team concluded that the May 21, 1995 event was caused by a degraded stationary gripper coil regulation circuit card.

### 3.0 CAUSE OF THE EVENT (Continued)

The stationary gripper coil regulation circuit card was carefully inspected following the reactor trip. The inspection revealed that resistor R52 had a loose solder connection. The loose solder connection was attributed to the age of the circuit card and the heat of the operating environment. As a result of the loose solder connection, the circuit card's current output to the stationary gripper coils would intermittently fail low. The low current to the stationary gripper coils allowed the Control Bank A, Group 2 control rods to drop into the reactor core. It is believed that as the circuit card's current output degraded, Control Rod B6 was affected first due to small differences in the current required to maintain stationary gripper engagement.

### 4.0 IMMEDIATE CORRECTIVE ACTION(S)

A manual reactor trip was initiated immediately after the Control Bank A, Group 2 control rods dropped into the reactor core.

Following the reactor trip, Control Room Operators acted promptly to place the unit in a safe, shutdown condition in accordance with emergency and other operating procedures.

The Shift Technical Advisor monitored the critical safety function status trees to ensure that plant parameters remained acceptable.

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### 5.0 ADDITIONAL CORRECTIVE ACTION(S)

The No. 2 seal on Reactor Coolant Pump 2-RC-P-1C exhibited similar performance during the May 11, 1995 Unit 2 reactor trip. An engineering evaluation was performed following the previous Unit 2 reactor trip. This evaluation included discussions with the seal manufacturer. During both events, the response data indicates that the No. 2 seal opened temporarily and subsequently resealed. The previous evaluation noted that the RCP seal is capable of opening on a high differential pressure condition and concluded that no seal problems exist since the No. 2 seal closed and the No. 1 and No. 2 seal leak-off flow returned to normal. Following this event the manufacturer was again contacted. Manufacturer recommendations for monitoring the No. 1 and No. 2 seal have been implemented. Engineering will monitor seal performance and provide appropriate recommendations to management.

A hot rod drop test was conducted which verified that Control Rod M-10 is fully operable. The IRPI rod bottom light for Control Rod M-10 has exhibited a slow response following reactor trips for several years. Engineering and vendor personnel have evaluated this condition and several actions have been implemented to correct it. These actions include the performance of Time Domain Reflectometry testing, resistance and inductance testing, and the replacement of the M-10 IRPI coil stack and signal conditioning module. Additional testing and maintenance actions are being evaluated.

Prior to the event, problems had been noted with the Main Generator Hydrogen Seal Oil Differential Pressure Regulator Valve. Maintenance was performed on the differential pressure regulator valve and the valve was returned to service. Additional problems were encountered during the reactor trip. Troubleshooting revealed foreign material in the seal oil system. The Main Generator Seal Oil System was flushed and the differential pressure regulator valve was replaced. The foreign material also affected the Seal Oil Pump Discharge Header Relief Valve. The relief valve was repaired and returned to service. The Main Generator Seal Oil Package was then returned to service and is functioning as designed.

Portable air conditioners are temporarily being used to provide increased cooling to the rod control cabinets.

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## 6.0 ACTIONS TO PREVENT RECURRENCE

All 12 stationary gripper coil regulation circuit cards in Unit 2 rod control system were replaced with new circuit cards. The installed movable and lift regulation cards were also tested. During the test, two cards were found to have loose solder connections. The two cards were repaired and successfully tested. The stationary gripper coil regulation circuit cards in inventory were also tested.

The RCE Team is continuing to investigate this event. The results of this investigation will be presented to management and the recommendations that are designed to prevent the recurrence of this event will be implemented.

The Root Cause Evaluation will include recommendations to permanently improve the cooling for the rod control cabinets.

## 7.0 SIMILAR EVENTS

A Unit 1 manual reactor trip was initiated on January 2, 1992 when more than one control rod dropped into the reactor core. Control Rod E-5 dropped into the core during the performance of the monthly control rod freedom of movement testing. While manually adjusting control rods to control delta flux variations resulting from the dropped rod E-5, Control Rod H-2 dropped into the reactor core. This event occurred due to a personnel error in the preparation of the troubleshooting guide for Control Rod E-5. Licensee Event Report 50-280/92-001-00 reported this event.

A Unit 2 Manual reactor trip was initiated on May 11, 1995 when more than one control rod dropped into the reactor core. While troubleshooting a rod control system urgent failure annunciator, a degraded stationary gripper coil regulation circuit card was found. After replacement of the circuit card, four Control Bank B, Group 2 control rods dropped into the reactor core. This event occurred due to the installation of a stationary gripper coil regulation circuit card with a cracked resistor. Licensee Event Report 50-281/95-004-00 reported this event.

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## 8.0 MANUFACTURER/MODEL NUMBER

Westinghouse Electric Corporation  
Stationary Gripper Coil Regulation Circuit Card  
Model Number: 6050D16G01

## 9.0 ADDITIONAL INFORMATION

Unit 1 was operating at 100% power and was not affected by this event.

A management meeting with the Nuclear Regulatory Commission is planned to discuss rod control issues.

A rod control system urgent failure annunciator was not received during this event. Evaluation of the event determined the nature of the degraded condition of the stationary gripper coil regulation circuit card did not create a condition requiring the urgent failure alarm to actuate. Testing indicated the output from the degraded circuit card was approximately 3.7 amps and the urgent failure alarm actuates at 3.6 amps.

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10CFR50.73

Virginia Electric and Power Company  
Surry Power Station  
5570 Hog Island Road  
Surry, Virginia 23883

June 20, 1995

U. S. Nuclear Regulatory Commission Serial No.: 95-309  
Document Control Desk SPS:BCB/SEH  
Washington, D. C. 20555 Docket No.: 50-281  
License No.: DPR-37

Dear Sirs:

Pursuant to Surry Power Station Technical Specifications, Virginia Electric and Power Company hereby submits the following Licensee Event Report applicable to Surry Power Station Unit 2.

REPORT NUMBER

50-281/95-005-00

This report has been reviewed by the Station Nuclear Safety and Operating Committee and will be forwarded to the Management Safety Review Committee for its review.

Very truly yours,

D. A. Christian  
Station Manager

Enclosure

pc: Regional Administrator  
101 Marietta Street, NW, Suite 2900  
Atlanta, Georgia 30323

M. W. Branch  
NRC Senior Resident Inspector  
Surry Power Station

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